

Study Guide

For use with pages 129–133

GOAL Estimate sums and differences of decimals.**VOCABULARY**

You can estimate sums using **front-end estimation**. You add the front-end digits to get a low estimate. Then you use the remaining digits to adjust the sum and get a closer estimate.

EXAMPLE 1 Estimating Sums and Differences

Use rounding to estimate the sum or difference.

$$\begin{array}{r} \text{a. } 6.8 \longrightarrow 7 \\ + 4.3 \longrightarrow + 4 \\ \hline 11 \end{array}$$

Round 6.8 up to 7.
Round 4.3 down to 4.

Answer: The sum is about 11.

$$\begin{array}{r} \text{b. } 11.26 \longrightarrow 11 \\ - 5.87 \longrightarrow - 6 \\ \hline 5 \end{array}$$

Round 11.26 down to 11.
Round 5.87 up to 6.

Answer: The difference is about 5.**Exercises for Example 1**

Use rounding to estimate the sum or difference.

$$1. \quad \begin{array}{l} 10 + 9 = 19 \\ 10.4 + 8.5 \end{array}$$

$$2. \quad \begin{array}{l} 8 - 6 = 2 \\ 7.6 - 5.7 \end{array}$$

$$3. \quad \begin{array}{l} 6 + 3 = 9 \\ 5.9 + 2.8 \end{array}$$

$$4. \quad \begin{array}{l} 9 - 4 = 5 \\ 8.63 - 4.17 \end{array}$$

$$5. \quad \begin{array}{l} 2 + 6 = 8 \\ 2.08 + 5.65 \end{array}$$

$$6. \quad \begin{array}{l} 11 - 6 = 5 \\ 11.43 - 6.28 \end{array}$$

EXAMPLE 2 Predicting Results

You are ordering a sandwich in a fast-food restaurant and you have \$5 to spend. The sandwich costs \$3.69. Estimate your change. Is this estimate high or low?

$$\begin{array}{r} \$5.00 \longrightarrow \$5 \\ - \$3.69 \longrightarrow - \$4 \\ \hline \$1 \end{array}$$

Round 3.69 up to 4.

Answer: Your change is about \$1. This estimate is low because you subtracted too much by rounding \$3.69 up to \$4.

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Exercises for Example 2

Estimate the change you will receive and tell whether the estimate is high or low. Explain.

$$\begin{array}{r} 20 \\ -12 \\ \hline 8 \end{array}$$

7. You buy a bottle of water for \$1.09. You give the cashier \$5.00. *about \$4*
estimate is high because you rounded down
8. You buy a compact disc for \$11.99. You give the cashier \$20.00. *\$8*
estimate is low b/c you rounded up
9. You rent a video for \$4.69. You give the clerk \$10.00.
estimate is b/c too much was subtracted when rounded up to \$5

$$\begin{array}{r} 10 \\ -5 \\ \hline 5 \end{array}$$

EXAMPLE 3 Using Front-End Estimation

Use front-end estimation to estimate the sum $9.42 + 5.66 + 7.03$.

Solution

(1) Add the front-end digits.

$$\begin{array}{r} 9.42 \\ 5.66 \\ + 7.03 \\ \hline 21 \end{array}$$

(2) Estimate the sum of the remaining digits.

$$\begin{array}{r} 9.42 \rightarrow 1 \\ 5.66 \rightarrow 1 \\ + 7.03 \rightarrow 0 \\ \hline 1 \end{array}$$

(3) Add your results.
 $21 + 1 = 22$

Answer: The sum is about 22.

Exercises for Example 3

Use front-end estimation to estimate the sum.

* 10. $6.6 + 4.7 + 3.4$

11. $8.2 + 1.7 + 7.3$

* 12. $2.23 + 7.1 + 6.54$

13. $5.62 + 8.33 + 4.2$

14. $9.16 + 1.35 + 3.56$

* 15. $2.73 + 5.41 + 7.84$

* 10) $\begin{array}{r} \text{Front} \quad \text{End} \\ \boxed{6.6} \\ + \boxed{4.7} \\ + \boxed{3.4} \\ \hline 13 + 2 = 15 \end{array}$ *about 2*

* 12) $\begin{array}{r} \text{Front} \\ \boxed{2.23} \\ + \boxed{7.1} \\ + \boxed{6.54} \\ \hline 15 + 1 = 16 \end{array}$ *about 1*

* 15) $\begin{array}{r} \text{Front} \\ \boxed{2.73} \\ + \boxed{5.41} \\ + \boxed{7.84} \\ \hline 14 + 2 = 16 \end{array}$ *.73 + .41 \approx 1
.84 \approx 1*

\approx "is about"